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ABSTRACT

The use of a model for treatment of English modals in a machine translation system being developed in Europe is discussed. The Eurotra system, sponsored by the Commission of the European Communities, is designed to translate into the nine official languages of the European Economic Community. The report first examines modality, the different ways of expressing modality, and why it is necessary to have a semantic representation of modal expressions for each language. The Palmer/Davidsen-Nielsen grid for representation of English modal meanings is then outlined. The Eurotra organization and translation system are also described. Eurotra's stratified framework of analysis and synthesis at four levels (morphological, configurational, relational, and interface) and the process of transfer from the source to the target language are explained, and its model for classifying modality type is presented, giving attention to the method used for identifying modality types in a text. Danish and English examples are referred to, and structural and processing problems are noted. (MSE)

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On the Translation of Modality in an MT-system

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1. Introduction

This is not a paper on modality. Rather it is an account of how we have had to work with a reduced, translation-oriented understanding of this phenomenon within Eurotra. This is why we will focus not on linguistic theory - but on the implications which some of the work within this field has had for our treatment of modal phenomena. In doing so, we shall have a look at the general architecture of our MT-system and the representations which we use to express linguistic knowledge that is tractable to machine translation. Most of the problems described here actually consist in using our formalism in a way that will yield adequate linguistic descriptions. First, however, we shall recapitulate some of the reasons why modality is not a trivial phenomenon to translate adequately in a simple way.

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2. Problem description

2.1 A working definition of modality

There may be as many definitions of modality as there are languages. A central characterization of this phenomenon is especially hard to come up with, since modality is a label that can cover such different types as epistemic, deontic and subject oriented modifications[1] of a proposition. These types of modality, however, are more easy to define, and by way of doing this, we shall extract the understanding of modality with which Eurotra is currently working.
The notions of mood and modality are so interlinked that they are hard to distinguish from one another, and it is often discussed where the borderline should be drawn. Both can be said to indicate a modal modification of a proposition. Being a machine translation project, however, we have had to be very pragmatic about this distinction, and we have therefore adopted the following widely shared delimitation:
Mood is the grammatical category[2] which includes such traditionally well-known members as indicative, imperative and conjunctive (subjunctive). All other means of qualifying a proposition modally are considered instances of modality. In this paper we shall deal exclusively with modality.

2.2 Different ways of expressing modality

A brief reminder of the most common ways you can express modality:

(1) the prime minister may be ill	**modal**
(2) perhaps the prime minister is ill	**adverb**
(3) the prime minister is possibly ill	**adverb**
(4) the prime minister is believed to be ill	**lexical verb**[3]

As you can see, these sentences have roughly the same meaning. Admittedly, there are other manifestations of modality, but these three are probably the most widely used: modal verbs, modal adverbs and lexical verbs with a modal content. The modal verbs constitute a well investigated system of their own in each

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[1] This commonly used subdivision of modality will be explained below.

[2] It has been argued convincingly by e.g. Palmer (Palmer 1986) that mood and modality are grammatical categories.

[3] By **lexical** verb we mean a verb which should appear in the lexicon. This is a status which can be distinguished from that of modal verbs, for which it can be argued that they belong to a class of sentential modification that need not - internally in our system - be represented by means of lexical items. **Paraphrase** is a term that is also sometimes used for this kind of modal expression.

European language. The modal adverbs (or modal particles) have been less examined, but as we shall see, they do not constitute a greater problem in translation. The lexicalized verbs, however, can sometimes cause difficulties. Their status is hard to establish - sometimes they may well be treated as a special class of modals - and the interplay between them and the system of modal verbs is not always easy to handle. Sometimes a lexicalized expression is best translated into one with a modal verb, sometimes not. But whereas this kind of consideration might be the cause of some concern for a human translator, a machine translation system has to be more modest in its aspirations. An MT-system would be succesful, if it could merely:

- identify manifestations of modality in a source language text.
- translate these into equivalent expressions in the target language.

With modal verbs being the most thoroughly examined conveyors of modality, research within Eurotra has progressed with a certain preference for this direction, and indeed our representation of modality is centered round the modals. We do not mean to exclude others manifestations, but they have proved somewhat hard to incorporate into a general theory of modality. At present, we are working with exactly that problem.

2.3 Why is it necessary to have a semantic representation of modal phenomena?

Modal verbs are ambiguous. It might well be said that they only get their meaning in connection with some context. The English 'must', for instance, has different interpretations in the following two sentences:

(5) Europe must take up the challenge
(6) He must have gone directly home

In (5) the speaker obliges the subject to take some action, whereas in (6) he makes a commitment as to the truth value of the proposition. Such ambiguity would not have posed a great problem, if it was always symmetrically reflected in translation. As it happens, this is the case with (5) and (6) when translated into Danish:

(5') Europa må tage udfordringen op
(6') Han må være gået direkte hjem

We can see that both instances of 'must' translate into Danish 'må'. This, however, is far from always the case; the following sentence can only be translated by means of 'være nødt til' in Danish:

(7) There is an ashtray on the table, if you must smoke.
(7') Der er et askebæger på bordet, hvis du er nødt til at ryge.

And 'må' cannot always be translated into 'must', either:

(8) Du må gerne låne min pen
(8') You may/can borrow my pen

Sometimes a modal verb translates best into a modal adverb:

(9) that will be the postman
(9') det er nok postbudet

The content of 'will' here, i.e. conveying that the following clause is 'the speaker's belief', cannot be translated into a Danish modal; but the modal adverb nok has exactly the same meaning.
Such examples are numerous. What they show is that not only is there good deal of variety in the way that modal verbs are translated into modal verbs, i.e. not a one-to-one relationship. But there is also a certain lack of symmetry as regards the kind of modal expression.Every language in a Euroversal translation system should be able to retain its own special expressions of various modal phenomena, and therefore a language independent typology of modality had to be set up.

3. The Palmer/Davidsen-Nielsen grid

Attempts to describe modal meaning by means of logical systems often suffer from the weakness that they have little in common with natural languages. If we want to describe modal expressions in a pragmatic, Euroversally acceptable way, we shall have to take recourse to a system that takes form as well as meaning into account.
Inspired by Palmer, Niels Davidsen-Nielsen (Davidsen-Nielsen 1986: pp.1184-1185) has proposed the following matrix for English modal meanings:

	possible	necessary	'others'
epistemic	POSSIBILITY	NECESSITY	PRESUMPTION
deontic	PERMISSION	COMPULSION	OBLIGATION
subject oriented	ABILITY	VOLITION	RESOLUTION

Epistemic modality should be understood as that kind of modality which indicates 'a certain degree of commitment by the speaker to what he says'[4].

[4] Palmer 1986, p.51.

Deontic modality is concerned with 'the necessity or possibility of acts performed by morally responsible agents'.

Subject-oriented modality has little in common with the two other categories. It is more concerned with qualities of the subject (e.g. ability, volition) than with the speaker's qualifying of a proposition.

Here are Davidsen-Nielsen's own examples for English (declarative sentences):

Epistemic:
Peter may be in London now
Peter must be in London now
Peter will be in London now
Deontic:
You can/may borrow my car
You must do it at once
You shall have it tomorrow
Subject-oriented:
She can speak French
If you will give me a clue (I shall assist you)

We have found that these modal meanings are Euroversal, and indeed this grid has been used as the basis for a modal typology in Eurotra. Before we go on to the application, however, a brief account of our project.

4. What is Eurotra?

4.1 Organization

Eurotra is a project for machine translation sponsored and organised by the Commission of the European Communities. It has two aims: the development of a system for machine translation for the nine official EEC languages, and the spreading of expertise, research and education in the fields of machine translation, natural language processing and computational linguistics in the twelve EEC member states. At present, research is being conducted at language centres in all 12 EEC states, with each centre basically responsible for the the analysis of the language spoken in that country.

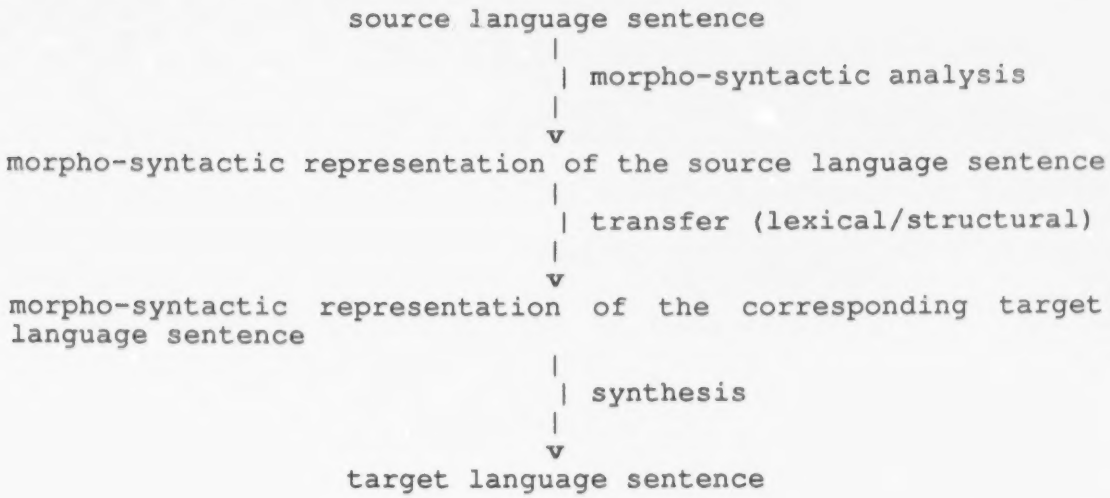
4.2 General design of translation system

The idea behind the Eurotra Translation System is that you put a text into the system at one end and receive a translation (in

[5] Lyons 1977, p.823.

any official EEC language) at the other end[6].

A simple outline of the system:



The source language text is analyzed morphologically and syntactically. A representation of the analysis result is then mapped onto a synthesis representation via a component called transfer. The transfer component consists of a set of rules which map source language items onto target language items. This may happen lexically (i.e. from word to word) or structurally (i.e. from structural representation to structural representation). Since the EEC has 9 official languages the following modules are needed:

9 analysis components
9 synthesis components
72 transfer components

This transfer approach must be distinguished from an interlingual approach. Source language items are mapped directly onto target language items without the help of an interlingua.
The Eurotra framework is a model of translation which provides a linguist with the concepts and tools with which to describe the above mentioned levels of representation. In order to achieve a maximum of descriptive power, however, analysis as well as synthesis has been stratified. Both components consist of a

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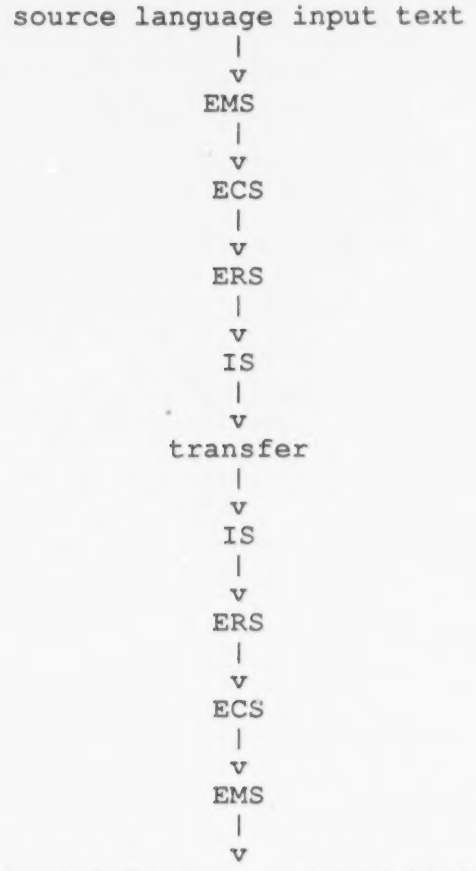
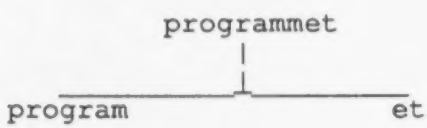
[6] The Eurotra system is basically intended as a translator's tool. Machine translation is not yet - nor will it ever be, I think - in a position to deliver 100% correct translations. Consequently the output will need some amount of post-editing. This significant detail is, nevertheless, not important for the scope of this paper.

series of representation levels (at present 4) which are ordered symmetrically around the transfer component:



At each level there is (minimally) one representation of the sentence in question. This representation is structured as a tree adorned with relevant features (see the examples below).

The EMS (Eurotra Morphological Structure) consists of a morphological representation of the input sentence.
A simplified example: the EMS representation for the Danish word 'programmet' (EN: 'the programme') would be:



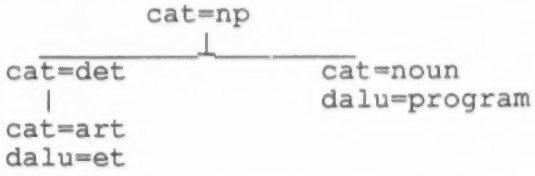
On the nodes, these features (among others) would be present:

{dalu=program, gender=neut, number=sing, msdefs=msdef}
  {dalu=program, gender=neut}
  {string=et, number=sing, msdefs=msdef}

The top node of the tree contains the features dalu (Danish lexical unit, or lexeme), gender, number and msdefs (morpho-syntactic definiteness). This information has been gathered from the daughter nodes (root and suffix) of the tree and percolated to the mother node. In the case of analysis, this morphological representation is then passed on to the ECS module.

ECS (Eurotra Configurational Structure) is a level for the representation of superficial constituent structure (noun-phrases, verbal phrases, etc.).

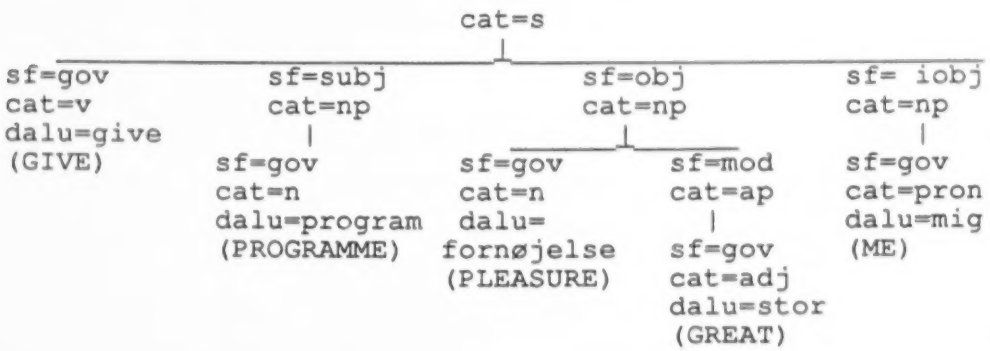
The representation of 'et program' would be:



Abbreviations:
Cat=(word or structure) category, np=noun phrase, det=determiner, art=article.

ERS (Eurotra Relational Structure) represents linguistic structure in terms of surface Grammatical Functions[7]. These grammatical functions are to a large extent identical with the traditional labels subject, object, indirect object, etc. As it may be seen from the following example, these functions are structurally represented in a dependency-like fashion, i.e. arranged (in canonical order) around a 'governor' - in the case of the sentence this governor is always the verb.

Ex.: 'programmet giver mig stor fornøjelse'
('the programme gives me great pleasure')

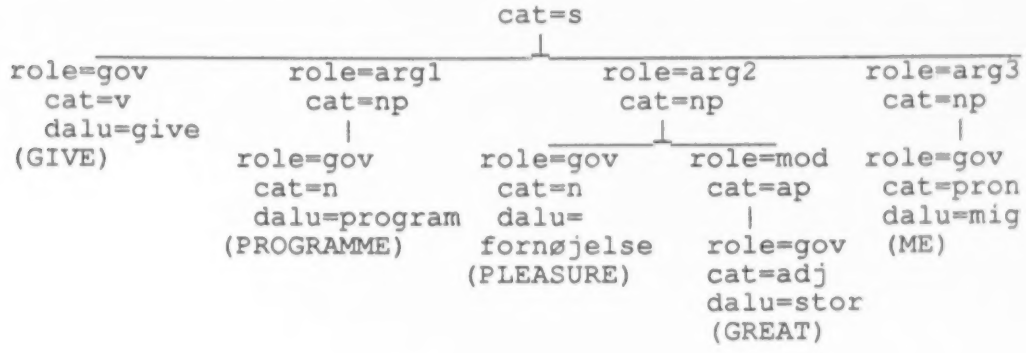


[7] This part of our linguistic background is mainly influenced by LFG (Lexical Functional Grammar) as developed by J. Bresnan and R. Kaplan. See e.g. Bresnan 1982.

Abbreviations:
sf=syntactic function, cat=category, gov=governor, subj=subject, obj=object, iobj=indirect object, mod=modifier, ap=adjective phrase, adj=adjective, pron=pronoun.

IS (Interface Structure) is the level that serves as final representation in analysis and input level in synthesis. Its structural representation looks a lot like that of ERS. But whereas ERS represents linguistic structure primarily in terms of **surface** grammatical functions, IS is committed to deep grammatical function representations. These are symbolized as 'roles':

Ex.: 'programmet giver mig stor fornøjelse'
('the programme gives me great pleasure')



5. The Eurotrian analysis of modality

The Eurotrian description model for modality was developed by Henrik Selsøe Sørensen, who was inspired by the work done by Palmer and Niels Davidsen-Nielsen. As yet, it does not pretend to cover all manifestations of modality, but in the past couple of years it has proved capable of encompassing most of the central modal phenomena we are dealing with - especially the modal verbs. The labels explained below are values of a feature **modal**, which is the central means of representing modality in our system.

5.1 Classification model

The basic dichotomy in the classification is that between **epistemic** and **deontic**; subject-oriented modality occupies a status of its own. The Palmer/Davidsen-Nielsen typology is easily recognizable in what is presented here.

5.1.1 Epistemic modality

All epistemically modalized sentences share the following characteristic: the speaker/writer offers a piece of information but qualifies its validity either in relation to the type of

evidence he has (judgmental) or in terms of the source of the evidence (evidential). The following is a characterization of the labels we operate with in the epistemic system. The names for the features all begin with 'nosu' ('no subject'). This is because the subject of the full verb in the proposition has no relation with the modality. Our naming convention is due to the fact that the system has been designed with an eye to the structural representation of the modality type in question.

Nosupo ('no subject possibility') indicates that the writer qualifies the proposition as possible.

Ex.: (10) Even the best plans can be wrecked[8]
(11) Most of the industry could disappear

Nosune ('no subject necessity'): the writer qualifies the proposition as necessary.

Ex.: (12) The satellite must be in sector 23
(13) The group must have solved the problem
Le groupe doit avoir résolu le problème (Fr.)

Nosupr ('no subject presumption'): the writer qualifies the proposition as likely.

Ex.: (14) By now, the UK will (probably) have joined the EMS
(15) Hai idea dove siano? Saranno tornati a casa (It.)
(Do you have any idea where they are? They'll have gone home)

Nosure ('no subject report'): this is the type of modality where the writer indicates the kind of evidence or observation on which his assertion is based.

Ex.: (16) Le montant serait de 5 mds de F (selon nos sources)
(The amount is said/believed to be 5 billion Francs)
(17) Peter skal være en dårlig forsker (Da.)
(Peter is said to be a poor researcher)

5.1.2 Deontic modality

The deontic category deals with the way the speaker/writer initiates action by the hearer and others (including the speaker/writer himself treated as an addressee). The names of these labels begin with 'two subject', indicating that two different agents are involved, one being the source of the

[8] The examples in this section have all been taken from the Eurotra Reference Manual 6.0.

modality and of the whole proposition, the other being affected by it.

Twospo ('two subject possibility'): the speaker/writer gives permission, thereby opening the possibility for the addressee to do something.

Ex.: (18) You may/can leave
(19) Residents may/can use the car park without a ticket

Twosne ('two subject necessity'): the speaker/writer gives an order, thereby imposing on the addressee the necessity to do something.

Ex.: (20) You must be back by ten
(21) Vous devez être de retour d'ici dix heures

Twosob ('two subject obligation'): the speaker/writer obliges the addressee to do something. The realization of this modality type often has a temporal meaning as well:

Ex.: (22) I shall be ill (tomorrow), I can feel it
(23) The programme shall comprise projects ...

5.1.3 Weakening of epistemic and deontic modality

The abovementioned modal values can be 'weakened' by means of past tense forms of modal verbs.

Ex.: (24) EN: most of the industry could disappear
(25) DA: det meste af industrien kunne forsvinde

These weakened forms, which indicate a certain tentativeness in the modal content, are represented by a feature **momod** (modal modification) that has the values **weak** and **no**. Due to the differing behaviour of modal verbs in European languages, sentences with a past form of the modal would be ambiguous in some languages and not in others. This is illustrated by the two examples above. The English 'could' does not have past time reference, whereas the Danish 'kunne' might well have. It depends on the context whether a past time interpretation is most likely; if past time is prevalent in the surrounding text, it can probably be conferred on the modal as well. At its present stage our system is not able to 'look across the sentence border'. This means that a Danish analysis would have to produce two representations of the sentence: one with {time=present, momod=weak} and one with {time=past, momod=none}.

5.1.4 Subject-oriented modality

Semantically these expressions are only peripherally connected

to our understanding of modality: the attitude or opinion of the speaker. Their nature is more lexical in that they are used to indicate volition or ability on the part of the subject and not necessarily the speaker. This is the very reason that their names begin with 'loop'.
Looppo (one subject looping possibility) is used to indicate ability and **loopne (one subject looping necessity)** is used to indicate volition.

Ex.: (26) John can speak Italian
(27) We will absolutely do it

5.2 Identification of modal types

A classification model for modality would not be of much use, if we did not know how to identify the various types of modality in a text. How do we distinguish the different meanings of must in:

(27) He must be in London now
(28) We must take up the challenge

For this purpose, we shall have to seek help in the 'stativeness' of the proposition verb, i.e. whether this verb is considered 'stative' or 'non-stative'. The concept of stativeness is well known and to a certain degree also well described in the literature; see for instance Quirk & Greenbaum 1973 (pp. 46-47), who characterize 'verbs of inert perception and cognition' as stative and most other verbs as 'dynamic' (non-stative).
Fortunately there seems to be a great degree of correlation between the modal type and the stativeness of the infinitive verb. In cases where a modal may indicate epistemicness as well as deonticness, it will receive an epistemic interpretation, if it is followed by stative verb and a deontic one, if it is followed by a non-stative verb. Thus 'must' is epistemic in (27) and deontic in (28).
A similar calculation is used, when a modal may indicate epistemic as well as subject-oriented modality:

(29) He can be anywhere at this moment
(30) He can run six miles in an hour

'Can' is epistemic in (29), because it is followed by a stative verb, and subject-oriented in (30), because it is followed by a non-stative verb.
It needs to be said that the coding of stativeness in the lexicon is not always a trivial task. As pointed out by Henrik Selsøe Sørensen (Sørensen 1988) characterizations such as the one found in Quirk & Greenbaum are not always as cut-and-dried as they seem. Verbs may change stativeness according to their context, as shown by the following example:

(31) He may continue for yet a couple of hours
(32) The rain may continue for yet a couple of hours

The main factor here is the semantic properties of the subject. (32) cannot be construed as non-stative. Rather the sentence might be paraphrased as "the condition that it is raining may continue for yet a couple of hours". This is not necessarily the case with (31) which has a human agent. Especially not if you add "now that he has had a cup of coffee", so that the meaning of 'continue' becomes something like 'resume his work'.

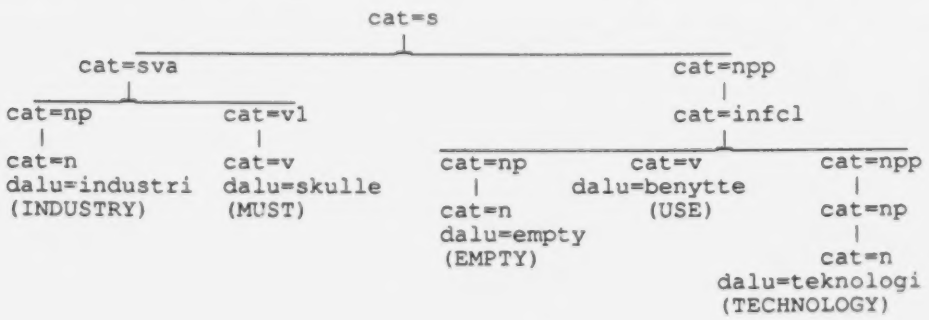
5.3 Representation

Two years ago the Eurotrian IS-representation of modality underwent a slight remodelling. The change did not apply to the abovementioned features/values, but to the structure with which to represent them. One method - the socalled 'elevation' - was abandoned in favour of another which relies more on the descriptive power in tree-structure. In this section we shall have have a look at both representations, because they clearly illustrate the kind of problem, we often have when trying to transfer linguistic knowledge in a language-independent way. First, however, we will have a glance at some ECS- and ERS-representations of modal sentences, since these representation levels have not been affected.
In fact, it is very much up to the individual Eurotra language group how to go about designing their own ECS- and ERS-modules. This is due to the fact that these levels are considered strictly monolingual and never have to be interfaced with representations from other languages. The following account of the Danish monolingual treatment of modal sentences therefore serves merely as an example of how this could be done.

5.3.1 ECS and ERS

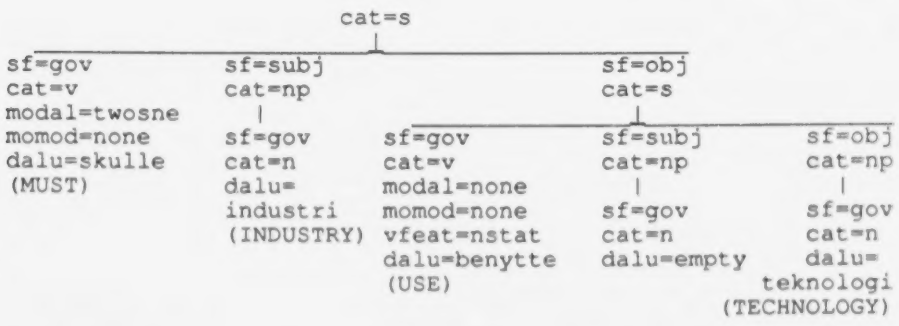
The ECS-representation of the sentence "industrien skal benytte teknologien" (EN: "Industry must use technology") will look like this:

(33) 'industrien skal benytte teknologien'
(EN: 'industry must use technology')



This is not a typical phrase-structure analysis. Already in the early stages of the project, the Danish group discovered that an approach based on the socalled field grammar developed by P. Diderichsen[9] would yield the most accurate descriptions of Danish. We will not go into detail with the 'field scheme' that underlies this approach. It is sufficient to note here that subject and modal verb are part of one major phrase category (sva or 'subject, verbal and adverbial') and the infinitive clause is part of another (npp, which is reserved for a.o. the object). As we shall later see, the isolated infinitive clause provides for embedding in connection with for instance consecutive modal verbs. Notice also the 'empty' np in front of the infinitive. It is meant as an empty placeholder subject for the verb, so that we can get this unit analyzed as a sentence at later levels.

The ERS-representation:



The surface-grammatical functions are arranged canonically around the dependency head, i.e. the verb. We can see that the infinitive clause is now embedded as a sentence in its own right with the status of object. Notice the modal values hanging on the v-nodes. For 'skulle' the value twosne (deontic necessity) has been computed on the basis of the infinitive verb being non-stative. The value for momod is 'none', because we are not dealing with a 'weakened' form. For 'benytte' modal as well as momod is 'none', because this is not a modal verb.

5.3.2 IS: Elevation approach

By elevation we understand a representation which has at the **sentence node** a piece of information (in the form of a feature) which used to be part of the tree structure at earlier analysis levels. This is the technique we have used until quite recently to represent modal values, and it should be clear from the following tree how it works.

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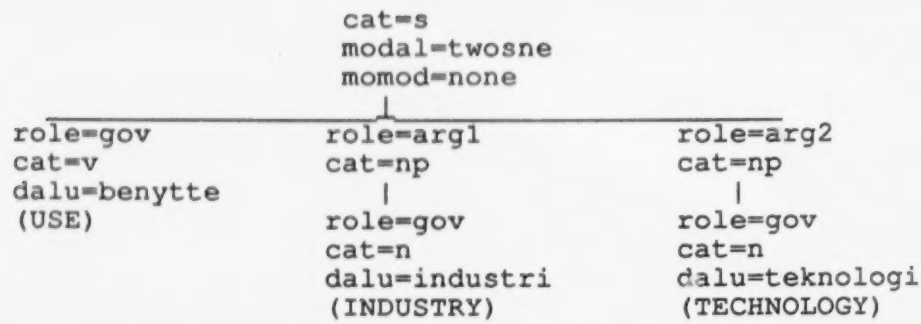
[9] Cf. Paul Diderichsen (1946): Elementær Dansk Grammatik, 3. ed. 1987, Gyldendal, Copenhagen.



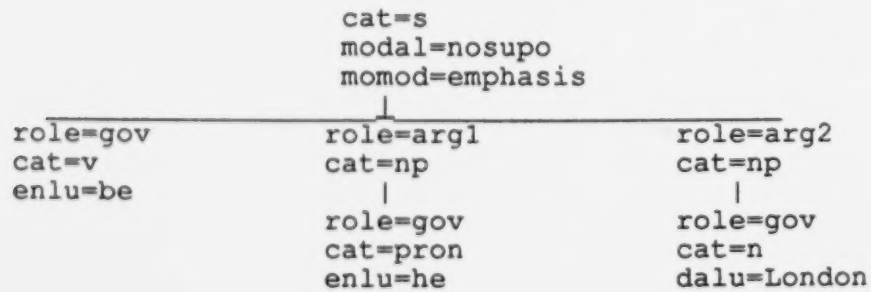
The modal verb has disappeared from the structure, and modality is only represented by the value twosne at the sentence node. In synthesis, the proper target language modal verb can be generated on the basis on this value alone, so as far as this kind of simple sentence is concerned, there should be no technical problems. But what about sentences containing more than one modal verb? This was handled by composite values at the sentence node. The sentence

(34) 'industrien skal kunne udnytte teknologien'
(EN: industry must be able to use technology)

would have a value 'twosnelooppo' - deontic necessity combined with subject oriented ability for modal - (with exactly the same tree). The target language synthesis component would then have to generate a suitable expression for these two modal values. Values consisting of three kinds of modality were not necessary, since such constructions are very rare[10].
The main trouble with the elevation approach was the socalled scope-problem. Having a composite elevated modal value meant that we were not able to specify clearly the scope of for instance modifying adverbials. The sentence

(35) 'he may very well be in London'

would come out like this:



[10] Danish is one of the languages that favour these constructions most. The sentence 'jeg gider ikke skulle kunne latin' ('I will not be bothered to have to be able to speak Latin') is not unlikely, but will not occur in written language.

The adverbial 'very well' is thus represented by 'momod=emphasis' at the sentence node, and it is clear that it is the nosupo modality (epistemic possibility) that is modified, in this case emphasized.
But for

(36) 'he may well be able to handle the situation'

such an elevated feature would not be specific enough. We would not know whether 'momod=emphasis' was supposed to refer to the **nosupo** or the **looppo** part of a composite nosupolooppo type of modality. Thus our representation might just as well refer to:

(37) 'he may be perfectly able to handle the situation'

So we have no means of specifying that in (36) it is the first modal that is modified, and in (37) it is the second. The same deficiency applies to negated modal sentences:

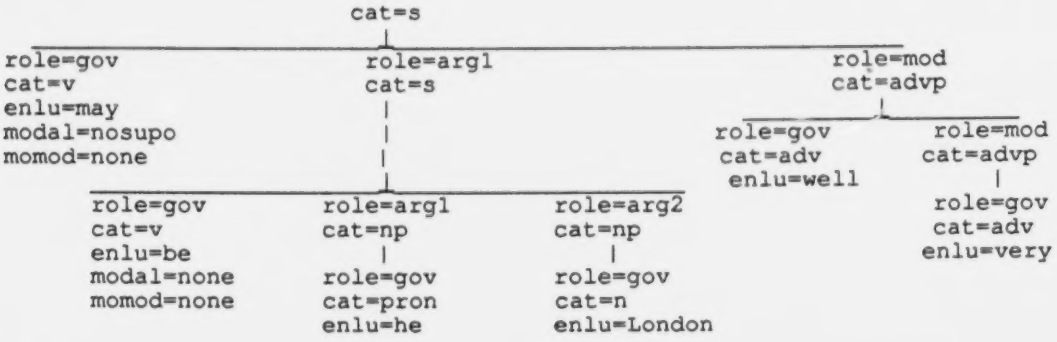
(38) he may not be able to handle the situation
(39) he may be unable to handle the situation
(40) he may be able not to worsen the situation

With modality represented as a feature value at s-level, the different scope for negations in (38), (39) and 40 - marked by underscore - is equally hard to represent. This will become clearer, when we have a look at the structure-based representation which we are currently using. It needs to be said, however, that in spite of the imperfections just mentioned, elevation is the only representation that is able to take any manifestation of modality into account. Whether the expression is a suffix, a modal verb, modal adverb or a lexicalized verb, it is possible for the analysis module to change such a surface expression into the kind of feature value exemplified above. Some of this versatility has been lost with the structure based representation.

5.3.3 IS: Structure-based representation of modality

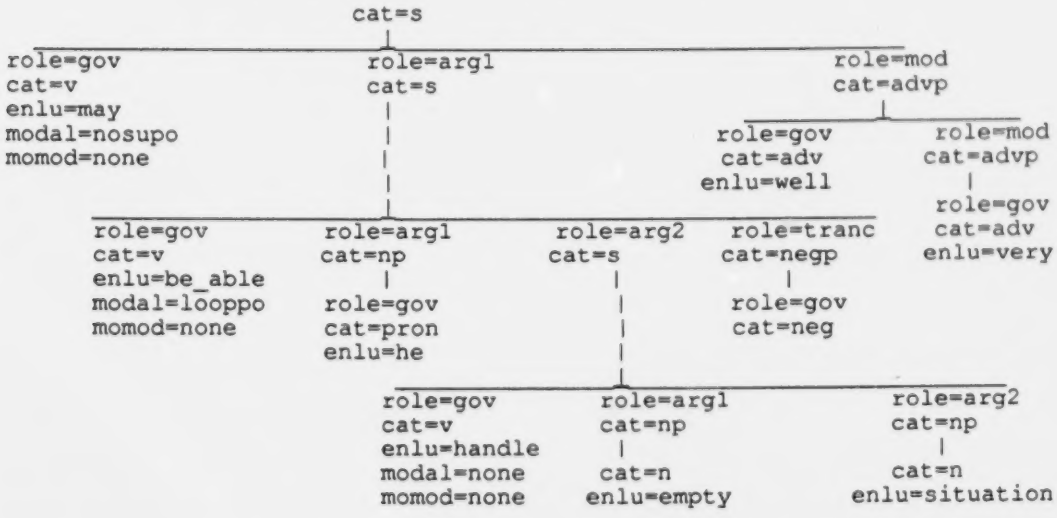
Seeing that elevation was handling scope relations insufficiently, we realized that modal verbs had to be retained in the IS-tree. This was the only way we could specify properly the scope of for instance modal modification. In our present implementation sentence (35) would look like this:

('he may very well be in London')



The modal values have disappeared from the sentence node. Instead they now appear at the verbal sentence governor. The 'very well' is represented as a modifier node at the same level in the tree as the modal verb, thus leaving no doubt as to whether it modifies 'may' or some other modal. Translation of the modal modifier will be done compositionally, i.e. with every element being mapped onto some target lexical item, instead of being translated via the medium of momod. As mentioned above, this feature is now only being used as an indicator of 'weakened' or 'tentative' modality in connection with past tense forms of modals. Notice that the proposition 'he be (in) London' is analyzed as the arg1 (subject) of the sentence. This is a special structure that we have reserved for epistemic modality. It makes sense, because you can say that the fact that he is in London is very well possible.
The clarification of scope that this model entails will perhaps become even clearer, if we look at an example with two modals:

(41) 'he may very well be unable to handle the situation'



The negation of 'be able to' (the negative prefix 'un') appears

as a special kind of modifying node (transconstructional[11]) in the last position of the canonical pattern. The thing to notice is that, due to the embedding, every verbal clause (including the modal) can here be modified without any interaction from other sentence levels. The computation of such scope relations may not be easy[12], but the important thing here is that they need not be blurred because of the representation.
A major drawback with this approach is, nevertheless, that unlike elevation it only takes into account modality in the form of modal verbs. Bearing in mind the profusion of modal expressions, one tends to find such a model insufficient. As pointed out by its advocates, however, the model need not actually encompass all modal manifestations. Modal adverbials, for instance, can easily be translated directly without any intermediary semantic system. Consider the universality of e.g. a modal particle for 'epistemic possibility':

(42)

EN: Maybe he has forgotten the book
DE: Vielleicht hat er das Buch vergessen
NE: Misschien heeft hij het boek vergeten
DA: Måske har han glemt bogen
FR: Peut-être il a oublié le livre
SP: Quizá ha olvidado el libro
GR: Isos xekhase to vivlio
IT: Forse ha dimenticato il libro

As we know, however, modality cannot be restricted to cover merely modal verbs and modal adverbs. The present representation is merely temporary, and research is now being carried out, not only with a view to establishing a more versatile representation but also with the aim to establish a joint theory of modality and mood.

5.4 Transfer and synthesis

A word needs to be said about how the modal IS-representation is transferred and generated into a target language surface expression.

As we have seen, the modal verb is now represented in the IS-structure. Needless to say, this verb is not translated directly. The computation of the target language expression must be done on the basis of the modal type. As an example, we might take sentence (35) - 'he may very well be in London' - and see what

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[11] A transconstructional is a kind of adverbial that modifies the entire sentence.

[12] Negation scope in connection with modality depends on modal type. In these two examples the first has **propositional** negation and the second **modal** negation:
He may not bother to come (it is possible that he doesn't ..)
You may not borrow my pen (I refuse your request ..)